

Evolution of groundwater chemistry in the shallow aquifer of a small tropical island in Sabah, Malaysia.

ABSTRACT

Groundwater is the prime source of freshwater in most small islands. A detailed groundwater and seawater chemistry study was undertaken from March 2006 to January 2007 to examine the evolution of groundwater in the shallow aquifer of Manukan Island, Sabah, Malaysia. Coastal groundwater aquifers especially for small islands are often exposed to heavy pumping and consequently to risks of seawater intrusion. Major ion chemistry analysis showed that the groundwater quality of the island experienced changes attributed to seawater intrusion. The groundwater has undergone a compositional change from Ca-rich to Na-rich which can be explained mostly by simple mixing process and cation exchange process. From the PHREEQC simulation model, calcite, dolomite and aragonite solubility showed positive mean values (0.65; 1.11; 0.51, respectively) of the saturation indices (SI) indicating supersaturation which attributed from the simple mixing and eventually cation exchange process. This information is important in protecting and remediating the disturbed aquifer situation.

Keyword: Groundwater chemistry evolution; PHREEQC; Small island aquifer; Seawater intrusion.